

SOOMIN SHIN

Ph.D. Candidate — LLM-Integrated Social Robotics — Human-Robot Interaction

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SUMMARY

Ph.D. researcher specializing in building **LLM-powered social robots that empower non-technical users to author robot interactions**. Led a 6-month deployment of a socially assistive robot in a pediatric therapy center, where therapists independently operated the system—identifying critical limitations of pre-scripted approaches that now motivate ongoing work integrating LLMs into social robot platforms. Experienced in full-stack system design, experiment design, and co-design with domain experts.

EDUCATION

Ph.D., Electrical and Computer Engineering — University of Waterloo *2023 – 2027 (Expected)*

- Supervisor: Prof. Kerstin Dautenhahn.
Focus: LLM-integrated social robots, deployable AI systems for non-technical end users

M.Sc., Brain and Cognitive Engineering — Korea University

- Research: Human perception and neural network models for contextual emotion recognition

B.E., Multimedia & B.A., Child Studies — Seoul Women's University

RELEVANT RESEARCH EXPERIENCE

Graduate Researcher — Social and Intelligent Robotics Research Lab, University of Waterloo *2023 – Present*

6-Month Real-World Deployment of a Socially Assistive Robot

- **Led end-to-end deployment** of a socially assistive robot at a pediatric speech therapy center for 6 continuous months, working with 9 children and clinical staff.
- **Engineered a full-stack, usability-first robot platform** that achieved high system reliability, enabling therapists to independently operate the robot in daily sessions and customize interaction flows to their patients' needs.
- **Applied co-design methodology** with therapists to iteratively refine the system for 3 years, ensuring the tools and interfaces matched therapists' real workflows and goals.
- **Designed and ran in-the-wild user studies** including session-level data collection, therapist feedback instruments, and engagement metrics to validate the system across the deployment.
- **Identified "interaction fatigue"** as a critical limitation of pre-scripted robot systems through systematic deployment analysis—directly motivating the LLM integration work below.

LLM-Powered Authoring System for Non-Technical Domain Experts (Current Work)

- **Architecting LLM-integrated Social Robot framework** integrating LLMs with robotic control, enabling a social robot to dynamically generate contextually appropriate interactions—replacing rigid pre-scripted interactions with flexible, LLM-powered content.
- **Designing and building an end-user authoring interface** that gives non-technical clinicians direct control over LLM-driven AI interactions — enabling them to create, customize, and iterate on AI-generated content without engineering support, grounded in 3 years of co-design research.
- **Evaluating LLM output quality using an AI-as-Judge framework** with a six-dimension rubric assessing vocabulary appropriateness, therapy alignment, and safety — developing scalable methods for human-centered evaluation of generative AI systems.

Research Intern — Korea Institute of Science and Technology (KIST) *2021 – 2023*

- Developed and evaluated a **multi-robot agentic system for isolation wards** incorporating telemedicine, emergency alerts, and delivery services. Published at IROS 2023.
- Studied how **perceived hierarchy in robot teams impacts user trust and service evaluation** through Wizard of Oz (WoZ) method, informing the design of multi-agent systems. Published at IROS 2023.
- Investigated **user-control vs. autonomy tradeoffs** in robot interaction design—directly relevant to designing systems where end users maintain meaningful control over AI agent behavior. Published at RO-MAN 2023.

Graduate Researcher — Cognitive Systems Lab, Korea University *2021 – 2023*

- Designed **human-model comparison experiments** evaluating contextual emotion perception in humans vs. deep neural networks. Published at ICMI 2022.
- Assessed pre-trained CNN model performance on in-the-wild datasets, developing protocols for evaluating AI system perception against human baselines.

SELECTED PUBLICATIONS

[HRI 2026] S. Shin, “From co-design to deployment: Toward sustainable and scalable socially assistive robots for speech-language therapy,” ACM/IEEE HRI, Pioneer Track. Acceptance rate: 23%.

[RO-MAN 2025] S. Shin, S. Chandra, A. Rajan, et al., “How co-design and personas can inform game implementation for robot-assisted speech therapy in clinical settings.” IEEE RO-MAN 2025.

[ICSR 2024] N. Azizi, S. Chandra, S. Shin, A. Rajan, et al., “Development of robot-assisted speech-language therapy: Co-design with speech-language pathologists.” ICSR 2024.

[IROS 2023] Y. Kwon, S. Shin, K. Yang, et al., “Heterogeneous robot-assisted services in isolation wards: A system development and usability study.” IEEE/RSJ IROS 2023.

[IROS 2023] S. Shin and S. S. Kwak, “Do hierarchies in a robot team impact the service evaluation by users?” IEEE/RSJ IROS 2023.

[RO-MAN 2023] S. Shin, D. Kang, S. S. Kwak, “Is a robot trustworthy enough to delegate your control?” IEEE RO-MAN 2023.

[ICMI 2022] S. Shin, D. Kim, C. Wallraven, “Contextual modulation of affect: Comparing humans and deep neural networks.” ACM ICMI 2022.

TECHNICAL SKILLS

Languages: Python (proficient), JavaScript (proficient), C/C++ (intermediate)

AI & LLMs: PyTorch, LLM integrated embodied agent pipeline design, generative AI for interaction authoring

Robotics & Systems: full-stack platform design, intuitive UI development for non-technical end users

Research Methods: User studies, co-design with domain experts, real-world deployment, qualitative & quantitative analysis

AWARDS & FUNDING

Physical AI Graduate Scholarship — Waterloo.AI & Philantra Foundation	2026 – 2027
Graduate Research Studentship — University of Waterloo	2023 – Present
International Doctoral Student Award — University of Waterloo	Sep 2023
Provost’s Doctoral Entrance Award for Women — University of Waterloo	Sep 2023